

Remarks:

These remarks are responsive to the Office action dated February 08, 2007. Prior to entry of this response, claims 1-14 were pending in the application. By way of this response, claims 1, 3-6, 8, 12 are amended, claims 7, 9-11 are cancelled. Applicants respectfully request reconsideration of the application and allowance of the pending claims.

Rejections under 35 USC § 112

Claims 1 and 2 are rejected under 35 USC 112, second paragraph, as being indefinite. Applicants have corrected a typographical error so that the claim refers to a heating "coil" rather than "coils". As such, the rejection should be withdrawn.

Rejections under 35 USC § 102

Claims 1, 3, and 6-14 are rejected under 35 USC 102(b) as being anticipated by U.S. Patent Number 5,740,675 (Shimasaki et al.). Applicants make no comment on whether the above rejection is correct or incorrect, but rather have amended claim 1. Specifically, Claim 1 has been amended to include additional features related to the duty cycle control illustrated in FIG. 1A. Specifically, as shown by FIG. 1A, a plurality of successive on-off periods are shown, where during the off periods, the coil resistance is measured and used as an indication of temperature. See, for example, page 5, lines 6-25, for example. Further, as shown in Fig. 5, by using such an approach, it is possible to measure temperature throughout engine operation, rather than only during startup engine warm-up, for example.

Referring now Shimasaki et al., the Examiner asserts that FIG. 13 shows measuring resistance when the heater is not energized. Before discussing the rejection, Applicants believe it may be helpful to more fully review Shimasaki et al. Specifically, FIG. 13 shows a configuration in which separate switch 66 is used to control current supplied to the heater, such that when it is turned on, an

Rejections under 35 USC § 103

Claim 2 is rejected under 35 USC 103(a) as being unpatentable over Shimasaki in view of U.S. Patent Number 4,524,264 (Takeuchi). Based on the above arguments with respect to claim 1, even assuming Takeuchi is combined with Shimasaki, Applicants still fail to find all claimed elements. As such, the rejection should be withdrawn.

Claims 4 and 5 are rejected under 35 USC 103(a) as being unpatentable over U.S. Patent Number 5,592,815 (Jelden) in view of Shimasaki.

Again, Applicants make no comment on whether the above rejection is correct or incorrect, but rather have amended claim 5 to specifically recite that a common electrical circuit is used with both sensors, as shown in FIG. 2. Such an approach enables a system to synergistically take advantage of at least two sensors in which an accurate temperature different signal may be obtained. Even assuming Jelden is combined with Shimasaki, Applicants can find no teaching of a circuit coupled to both a first and second heating coil as recited. As such, the rejection should be withdrawn.

infinitesimal current is supplied. See Col. 7, lines 43-56. Separate from this heater control, a duty cycle is provided by the ECU to the base of the power transistor Tr, as noted at Col. 5, lines 5-18. As such, the temperature sensing in this embodiment relies on switch 66 overriding the duty cycle control.

Unlike Shimasaki et al., the approach of claim 1 effectively utilizes the heater duty cycle control off periods as opportunities to sense temperature, so that a temperature reading may be provided more fully throughout engine operation as shown by FIG. 5 of the present application, for example. Specifically, Claim 1 recites:

1. A system for determining a temperature of exhaust gases from an engine, comprising
an exhaust gas sensor having an electric heating coil, said sensor communicating with the exhaust gases;
an electrical circuit for generating a signal indicative of the resistance of said heating coil when said coil is de-energized; and
a controller receiving said signal and calculating said temperature of said exhaust gases based on said signal, where the controller generates a duty cycle to successively energize and de-energize said coil, and where the controller calculates said temperature during a plurality of successive de-energized periods of the duty cycle, the heater being operated to heat the sensor when it is below its desired operating temperature.

Applicants have reviewed Shimasaki et al. and can find no disclosure of utilizing a plurality of de-energized periods of the heater as controlled by the heater duty cycle. Rather, as noted above, the embodiment of FIG. 13 utilizes a separate switch 66 from the duty cycle control. Further, the embodiment of FIG. 3 also specifically states that the temperature is measured while the heater is being energized, and thus may result in inaccurate readings. See Col. 7, lines 18-23.

Based on the above arguments, the rejection of claim 1 should be withdrawn. Similar arguments apply to claims 3, 4, 6, and 12.

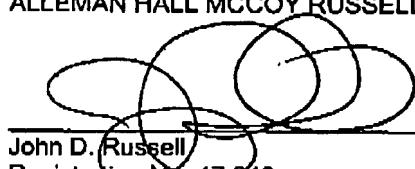
Conclusion

Applicants believe that this application is now in condition for allowance, in view of the above amendments and remarks. Accordingly, Applicants respectfully request that the Examiner issue a Notice of Allowability covering the pending claims. If the Examiner has any questions, or if a telephone interview would in any way advance prosecution of the application, please contact the undersigned attorney of record.

Please charge any cost incurred in the filing of this Response, along with any other costs, to Deposit Account No. 06-1510.

Respectfully submitted,

ALLEMAN HALL MCCOY RUSSELL & TUTTLE LLP



John D. Russell
Registration No. 47,648
Customer No. 36865
Attorney/Agent for Applicants/Assignee
806 S.W. Broadway, Suite 600
Portland, Oregon 97205
Telephone: (503) 459-4141
Facsimile: (503) 459-4142